

stomach contents examined, it is surprising how little fruit-pulp is found. Again, if blackbirds are kept in confinement and fed on similar ripe fruit very little is consumed.

Careful observation and experiment have shown that in most cases where ripe fruit is attacked it is not due to a scarcity of food, and that very much more fruit is damaged than eaten. In different parts of the United States it has been found that the provision in orchards of water has considerably lessened the damage by birds to the fruit.

Mr. G. F. Burgess, another correspondent, asks, "If the birds need water, why provide food? If it is food they want, why provide water? It is quite possible," he continues, "that the birds acquired the 'fruit habit' in times of drought, but the habit is now so well established that the damage goes on in wet and dry seasons alike." This brings us much nearer the actual truth. A supply of water may keep young birds away from the fruit in times of drought, but once a bird acquires the fruit-eating habit, experience shows that nothing will change it.

This change of habit in the nature of the food opens a big question, and one around which much controversial matter ranges, but where cases have been subjected to careful investigation by competent workers one striking fact has been brought out, viz., that the particular species of bird or birds had been allowed to increase unduly, and is now too plentiful. This has been proved in the case of the cereal-feeding habit of the rook,¹ and the fruit-eating habit of the blackbird and missel thrush.

It seems surprising that, in a country where the question of producing the maximum amount of home-grown food is one of vital importance, so many economic problems related thereto have been almost entirely neglected. We are offering protection to certain injurious wild birds and permitting other beneficial species to be wantonly destroyed, with the result that food to the value of tens of thousands of pounds sterling is annually destroyed. That the same thing is taking place in connection with our fisheries there is good reason to believe.

In other countries the State has made provision for systematic and continued investigation on the subject, much to its material benefit, but as a writer has recently very pertinently stated, "In the matter of economic ornithology we in England are disgracefully behind the times; the Board of Agriculture seemingly prefers to leave this matter to private enterprise, or to deal with the matter in such a perfunctory manner as to be positively ridiculous, making us the laughing-stock of the nations."² In the past the want of financial means has been the excuse, but the present apathy can scarcely be due to that cause, seeing the manner in which huge sums are being used out of the Development Grant for far less important purposes.

WALTER E. COLLINGE.

¹ "The Food of Some British Wild Birds." (London, 1913.)

² *Ann. and Mag. Nat. Hist.*, 1908 (s. 8), vol. ii., p. 132.

NOTES.

AMONG those who were on board the *Royal Edward* when she was torpedoed and sunk in the Ægean Sea was Capt. Charles Bertram Marshall. When last seen he was standing on the deck giving orders to his men to keep cool; and he seems to have died as he had lived, a brave, generous, and unselfish man. Although Capt. Marshall had no intention of devoting himself to purely scientific pursuits, he belonged to that too rare class of medical men who, before embarking upon the practice of their profession, endeavour to obtain a thorough all-round training in the ancillary sciences and experience in original research. In addition to the customary series of hospital appointments, Dr. Marshall held a demonstratorship in anatomy in Manchester University, and carried out a successful investigation in reference to the movements of the stomach and the chemistry of the digestive processes, for which he received the M.D. degree with commendation. He was a man of exceptional ability and charm of character, and he gave promise of accomplishing much in the advancement of the science of medicine.

We regret to see the announcement that Lieut. J. A. Dixon was killed at the Dardanelles on August 9. After a first season's work in Nubia, he took part in the expeditions sent to Abydos in Upper Egypt by the Egypt Exploration Fund in the winters 1909-10 and 1910-11, in the capacity of draughtsman and assistant excavator. The illustrations of the volumes dealing with those expeditions are a sufficient testimony to the amount and quality of his work. His ambition, however, was to make a name for himself in the field of copying in water colours the scenes which adorn the rock tombs of Thebes, and his first efforts in this direction had met with considerable success. In the desert camp, where the qualities of a man are tried to the utmost, he was a keen worker and a bright and frank companion, generous to the last degree. He loved Egypt and everything in it, from the luxury of a Cairo hotel to the discomfort of the excavator's camp. His treatment of natives was ideal: sympathetic, just and friendly, and yet with that background of firmness which too many Europeans lack, but which is, in truth, the only passport to the respect and admiration of the Arab. Since 1912 he had been connected with the expeditions of Mr. Wellcome in the Sudan, but there is little doubt that his heart was in Egypt proper, and that, had he lived, he would have contrived to return to his painting among the Theban tombs.

MR. CLAUDE GRAHAME-WHITE and Mr. Harry Harper contribute to the *Fortnightly Review* for September an interesting account of "Zeppelin Airships: their Record in the War." It is refreshing to find an article on aircraft, especially Zeppelin airships, which is not full of that nonsense which the present conflict has inspired in overflowing measure. A highly-complex technical problem such as the airship presents is not readily made clear to the lay mind, and the authors of this article give only slight space to a discussion of technical questions of construction,

confining themselves to a consideration chiefly of the Zeppelin airship as a weapon of war. This aspect, while fascinating to the layman, is to the average technical mind much the least attractive avenue of speculation and inquiry, seeing that difficulties which can be comfortably overcome by a peace-airship are quite insuperable in one for use in offensive operations. It is easy to conceive airships in the future having sufficient strength to withstand all ordinary weather, but it is frankly impossible to conceive an airship that will stand any chance of surviving the anti-aircraft gunnery of the immediate future, provided it can be seen by the gunner. For offensive operations of value, the airship cannot avoid being in sight of the ground, and consequently it will be unable to undertake such operations. All war, however, does not consist of fighting, and there is plenty of scope for the excellent qualities of lighter-than-air aircraft in reconnaissance and so forth. It is a pity that so much ill-informed matter has been written about Zeppelins as aerial "Dreadnoughts"—in point of fact, there is very little else they can do when attacked but run away. The authors of this article are to be congratulated on the sane aspect of the case they have presented.

DURING the recent meeting of the British Association, the members were invited by the Manchester Literary and Philosophical Society to visit its house in George Street, Manchester. Particular interest is attached to this house, since it was for many years the scene of the labours of John Dalton, and contains a collection of his apparatus, lecture diagrams, notebooks, and manuscripts. This collection, along with other treasures belonging to the society, was set out for exhibition, and was described to the visitors by Prof. W. W. Haldane Gee. The apparatus, which is in a remarkably good state of preservation, includes a valuable collection of instruments used by Dalton in his researches and in his lectures on chemistry, heat, light, sound, electricity, mechanics, meteorology, and astronomy. The diagrams, many of which refer to the atomic theory, are those used by Dalton to illustrate his lectures. They are described by Prof. W. W. Haldane Gee, Dr. H. F. Coward, and Dr. Arthur Harden in a "Memoir" of the society. The notebooks, manuscripts, etc., which are also described in the "Memoir," show the nature and scope of Dalton's lectures, and give some interesting information about his expenses. The Manchester Literary and Philosophical Society is one of the oldest scientific institutions in the world, and has held its meetings in the house in George Street for nearly 120 years. The list of its past presidents includes such illustrious names as James Prescott Joule, John Dalton, Sir William Fairbairn, and Sir Henry Roscoe. The society possesses a very valuable library, which includes a collection of the publications of almost all the important scientific societies from their foundation.

A TABLET was unveiled on September 18 in Cheltenham College Chapel, and a life-size portrait by Mr. Hugh Riviere in the College Library, to the memory of Dr. E. A. Wilson, who perished with Captain Scott

in the Antarctic. The late Dr. Wilson was educated at Cheltenham College.

At the sale by auction of the Amesbury Abbey estate on September 21, the historic monument of Stonehenge was purchased for 6600*l.* by a local landowner, Mr. C. H. E. Chubb, of Bemerton Lodge, Salisbury. The estate came into the market in consequence of the deaths of Sir Edmund Antrobus and of his only son, who was killed in action last October. As Stonehenge is under the protection of the Ancient Monuments Act, no steps can be taken by the owner to alter or remove any parts of this remarkable relic of antiquity.

ACCORDING to the *Morning Post* correspondent at Christiania, a telegram from Archangel to the Foreign Office there states that the *Eclipse* Expedition, under Commander Sverdrup, has returned, and that all on board are safe. Commander Sverdrup left Christiania on July 15, 1914, at the request of the Russian Government, with the object of seeking for traces of the Russian expeditions under Brusiloff and Rusanoff, which had been lost in the Polar regions. He wintered in the western portion of the Taimyr Peninsula, and engaged in exploration work during the succeeding summer, but found no traces of the missing Russians.

SIR FREDERICK DONALDSON, Chief Superintendent of Ordnance Factories, has been appointed to act for the time being as technical adviser to the Ministry of Munitions. In the meantime, arrangements have been made for Mr. V. L. Raven, chief mechanical engineer of the North-Eastern Railway, whose services have been temporarily placed at the disposal of the Minister of Munitions by the board of directors, to perform the duties of acting chief superintendent of the Royal Ordnance Factories, Woolwich.

THE Minister of Munitions of War, with the concurrence of the Home Secretary, has appointed a committee to consider and advise on questions of industrial fatigue, hours of labour, and other matters affecting the personal health and physical efficiency of workers in munition factories and workshops. The committee is constituted as follows:—Sir George Newman (chairman); Sir Thomas Barlow, Bt., K.C.V.O., F.R.S.; G. Bellhouse; Prof. A. E. Boycott, F.R.S.; J. R. Clynes, M.P.; E. L. Collis; Dr. W. M. Fletcher, F.R.S.; Prof. Leonard E. Hill, F.R.S.; Samuel Osborn, J.P., Sheffield; Miss R. E. Squire, and Mrs. H. J. Tennant. Mr. E. H. Pelham has been appointed secretary to the committee; and all communications should be addressed to him at the offices of the Board of Education, Whitehall, S.W.

THE nature and limitations of portable fire-extinguishers were dealt with in articles in *NATURE* of June 3 and July 22. Sir Edward Henry, the Commissioner of Metropolitan Police, has now repeated a warning issued on June 28 that chemical liquid fire extinguishers should not be purchased without a written guarantee that they comply with the specification of the Board of Trade, Office of Works, Metropolitan Police, or some approved fire prevention

committee. Many dry powder fire extinguishers are much advertised. The Commissioner warns the public, as the result of experiments made at his instance, by a competent committee of experts, that no reliance can be placed upon such appliances for effectively controlling fires such as are likely to be caused by bombs—explosive or incendiary. The Commissioner is advised as the result of these experiments that the provision, and prompt and intelligent use, of water or sand or of both in dealing with such outbreaks of fire is the best, simplest, and most economical safeguard.

THE United States National Museum, Washington, has recently obtained the greater part of a fine skeleton of Mastodon from a swampy deposit near Winamac, Indiana. The bones are in a good state of preservation, and when prepared will be mounted for exhibition.

THE eighth number of the *Boletin* of the Sociedad Physis of Buenos Aires, just received, completes the first volume of this publication. The society was founded in 1912 for the promotion and diffusion of natural science in the Argentine Republic, and has met with considerable success. All the published papers record the results of original research, and each part of the journal concludes with a useful series of reviews and notices of writings dealing with the geology, botany, zoology, and anthropology of South America.

DR. J. W. FEWKES, of the U.S. Bureau of Ethnology, has started to continue his exploration of the remarkable ruins in Mesa Verde National Park in south-west Colorado, which are believed to be the work of the ancestors of the modern Pueblo Indians. One of these constructions, known as Spruce Tree House, resembles a gigantic hotel built in a cave, the floor of which is about 50 ft. above the bottom of the canyon, while the roof is 80 ft. high. In some places the rooms occupied three stories, and the building may have accommodated 350 persons. Cliff Palace is nearly three times the size of Spruce Tree House, and, like it, stands in a cave to which access is gained by steps cut in the rock and by ladders. An important part of this structure is a ceremonial chamber entered from a subterranean passage. Here it is believed that the tribal ceremonies were performed. These structures, when fully excavated, will throw much light on the social life, religious and secular rites of this remarkable people.

WE have received a copy of the Madras Agricultural Calendar for the year 1915-16, issued by the Madras Agricultural Department, which contains a series of useful articles on green manuring, cotton and its cultivation, on various veterinary subjects, and on native implements and subjects of value to the small proprietor. The calendar portion gives information about cattle fairs and other matters of native interest, and, by way of introduction, the purpose of the Agricultural Department is fully explained.

THE first number of the Journal of the Botanical Society of South Africa has recently been published under the editorship of Prof. H. H. W. Pearson,

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hon. director of the National Botanic Gardens, Kirstenbosch. It includes a short notice of the late Lord de Villiers, the first president of the society, to whose interest and influence the establishment of the gardens and the founding of the society was so largely due. An interesting account of former public and private acclimatisation and botanic gardens at the Cape, with an outline of the establishment in 1913 of the National Garden at Kirstenbosch, is also given. It is a matter of regret that this important enterprise seems likely to suffer financially owing to the war, just when funds are so essential for furthering the initial stages of its development. It is to be hoped that the Botanical Society, to the assistance of which the new National Garden owes so much, will continue to bear its share in the responsibility of developing the Garden as generously as in the past, and will be able to enlist many new members to help on the work.

THE Transactions of the Royal Scottish Arboricultural Society, vol. xxix., part ii. (July, 1915), contain several articles dealing with larch, the most interesting being an account of the first-generation hybrids between the Japanese and the European species, which are making astonishingly rapid growth on two estates in Perthshire, where they originated a few years ago. A new species, *Larix olgensis*, from eastern Asia, is described and figured; but it is not considered likely to be of any value for economic planting. Mr. Marshall, who has extensive plantations of larch in the Lake district, gives the results of experiments, which show that the wood of the Japanese larch is considerably inferior in strength to that of the European species, at any rate when young and of a size only big enough for pitprops. The Transactions contain useful notes on various insect and fungus pests. It is satisfactory to learn that new regulations of the Postmaster-General facilitate the purchase of home-grown Scots pine for use as telegraph poles.

THE number of species of *Ficus* at present known from tropical Africa is 173, and the genus has recently been revised for the "Flora of Tropical Africa" by Mr. Hutchinson. Descriptions of the new species, illustrated in many cases by useful text figures, are given in *Kew Bulletin* No. 7, 1915. Our knowledge of the genus has been increased mainly owing to the collections made by Dr. J. Mildbraed, and to the extensive material sent to Brussels from the Belgian Congo. The genus is broken up into five subgenera; four of these have the bracts of the ostiole of the receptacle spread horizontally across the mouth, so that some of them are visible from the outside; but in the fifth subgenus, *Bibracteatae*, containing 73 species, the ostiole from outside looks like a single pore-like slit, as all the bracts are abruptly reflexed and point vertically downwards into the receptacle. The present paper deals mainly with species belonging to this subgenus.

"THE Trees and Shrubs of the Pacific Coast" is the title of an interesting paper by Mr. F. R. S. Balfour, printed in the Journal of the Royal Horticultural Society, vol. xli., part i., August, 1915, which

was delivered as a lecture before the society in April of this year. The paper is illustrated by a number of excellent reproductions of the trees and shrubs mentioned in their native habitats from Vancouver to California. The region near Mount Rainier, discovered by Vancouver in 1792, is the home of many fine conifers, notably *Abies nobilis*, *Thuya gigantea*, Douglas firs, etc., and a number of interesting shrubs, seeds of which were collected by Mr. Balfour. The Siskiyou Mountains, on the borders of S. Oregon and N. California, were also visited in order to see that rare and interesting conifer, *Picea breweriana*, the weeping spruce, of which some excellent photographs are reproduced. Possibly not more than 5000 trees of this species exist in the wild state, but it has now been introduced to Britain, and the young trees are thriving well. The drooping branchlets, some 6-8 ft. long, hang down like those of the weeping willow. The last region described in the paper is the Monterey district of California, the home of those well-known and useful conifers *Pinus insignis* and *Cupressus macrocarpa*. The latter is illustrated by photographs of picturesque old specimens. These trees, the native habitat of which is now a very restricted area, were long ago introduced to Europe, Chile, New Zealand, and the Cape, where they are thriving as in their native country.

Lignum nephriticum, the wood which, infused with water, yields a yellow solution possessing a remarkable blue fluorescence, has been an object of interest ever since it was first brought to Europe from Mexico, soon after the discovery of America. Robert Boyle made a systematic study of the solution in 1663, which may be regarded as the first serious investigation of the phenomenon of fluorescence, but considerable doubt has existed as to the exact scientific identity of the tree yielding the wood. The most recent contribution to the history of *Lignum nephriticum* is published in the Journal of the Washington Academy of Sciences (vol. v., No. 14, August 19, 1915) by Mr. W. E. Safford. He gives the name *Eysenhardtia polystachya* (Ortega), Sargent, to the tree, and states that its botanical identity has remained uncertain until the present time. This statement, however, is scarcely correct, since the tree was referred to the genus *Viborquia* by Ortega, a name superseded by the later name of *Eysenhardtia* of Humboldt, Bonpland, and Kunth. These authors correctly named the plant *E. amorphoides* in 1823, and Mr. Safford, following Sargent, merely restores Ortega's old specific name, *Viborquia polystachya*, making *Eysenhardtia amorphoides* a synonym of *E. polystachya*. The story of *Lignum nephriticum*, with an account of its remarkable properties and its synonymy, was set out at some length in the *Kew Bulletin*, 1909, pp. 293-305, by Dr. Stapf, and Mr. Safford adds very little to the account there given. His paper is of value, however, because he reproduces Ortega's original illustration of *Viborquia polystachya* and also a photograph of specimens recently collected at Tamaulipas, Mexico. It was owing to its supposed diuretic properties that the wood of this leguminous tree received the name *Lignum nephriticum*.

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WE learn with regret that a heavy gale which passed over the island of Dominica caused a considerable amount of damage to the Botanic Garden. About 100 trees, some of large size, were uprooted, and many others are reported to have had their tops blown off or to have been seriously damaged by the loss of branches. Unfortunately, a number of species of rare trees represented in the Garden by only a single specimen have been destroyed. The clearing of the devastated area will be a work of many weeks, and at least a generation must elapse before the Dominica Gardens can be restored to their former interesting and beautiful condition. Some of the lime estates in the island were also badly damaged, not only owing to the loss of crop, but also by the uprooting of a considerable number of trees.

IN Bulletin No. 47, issued by the Agricultural Research Institute, Pusa, Mr. Peter Abel describes a tour of the sugar factories in the Bihar district of northern India, made at the invitation of the Indian Government, with the object of advising on the machinery in use and the general management of the plants. Judged by the standard of the West Indies and America, these Indian factories are small, and run on such primitive lines that many of the labour-saving devices generally used in the west are not applicable. The approaches and exits were in most cases badly arranged, resulting in blocks and confusion of the bullock carts delivering cane. As the feeding of the mills is done entirely by hand a great deal of labour could be avoided by the use of suitable derricks for handling the cane, and at the same time give a more regular feed to the mills. The methods of clarification appeared to be capable of considerable improvement, many of the appliances being defective or badly situated for inspection and cleaning. In most of the factories the evaporators and vacuum pans were adequate, but in only two were the crystallisers sufficient in number to ensure the maximum reduction of the sucrose in the molasses. Since the quality of sugar depends to a great extent upon clarification, the inefficiency of this section of the plants is responsible for the inferiority of the average product. One small factory, however, possessing an adequate clarifying and crystallising plant, was producing two sugars of excellent quality. Although the Indian factories do not at present obtain a satisfactory extraction, a few modifications and additions would enable them to obtain results very little behind those of the best works in Java.

THE Carnegie Institution of Washington has just published Prof. E. C. Case's fifth contribution to our knowledge of the vertebrate fauna of the Permian-Carboniferous red beds of North America (Publication No. 207). More than half of the work is an exhaustive technical description of the geological formations themselves in all known regions, with numerous quotations from the writings of other authors. The second part is more general, and includes a valuable summary of the results of Prof. Case's own researches. The vertebrate fauna is one of estuaries, swamps, alluvial plains, and open woodlands. Among the fishes, even the sharks have a fresh-water appearance.

All the amphibians are of the usual Labyrinthodont pattern, with a carnivorous dentition. Among the reptiles the teeth are more varied, but hitherto no form has been discovered which can be regarded as purely or even largely herbivorous. Some species must have been powerful carnivores, others may have eaten plants mingled with a main diet of hard-shelled molluscs. In outward shape, according to Prof. Case's numerous restorations, there is monotonous sameness, both among amphibians and reptiles—animals with large head, short neck, ungainly trunk, and weak limbs. The only notable feature is the well-known dorsal crest of *Dimetrodon* and its allies, produced by the elongation of the neural spines of the backbone. During life, of course, more variety may have been imparted to the different forms by coloration and epidermal structures. Prof. Case concludes that although the earliest of the North American Permo-Carboniferous reptiles are closely related to those found in South Africa, the evolution of the group was different in the two regions. In North America all specialisations seem to have been in the direction of higher reptiles, while in South Africa specialisation was clearly in the direction of mammalia.

THE fifty-third annual report of the Government cinchona plantations and factory in Bengal for the year 1914-15 is a remarkably interesting document, and affords striking evidence of the valuable work unobtrusively carried on by the distinguished botanists who have held the post of superintendent of cinchona cultivation in Bengal. Between 1887 and 1892 enough bark was produced in the plantation at Mungpoo to meet the annual demand, never exceeding 4000 lb., for quinine. By 1905 the demand had risen to 15,000 lb., but the annual yield from plantation bark never reached 9000 lb. of quinine. A new plantation was started at Munsong, the old one improved, the factories enlarged, and a quinologist appointed, with the result that now the annual output of quinine has increased to as much as 50,000 lb. Not only has the quality of the trees planted been greatly improved and the area under cultivation enlarged, but the methods of extraction now employed have raised the average quinine percentage from 2.5 to 4.5. Since 1905 the annual possible harvest has increased from about 300,000 lb. of 2.5 per cent. bark to 1,000,000 lb. of 4.5 per cent. bark, a quantity assured for many years to come; the possible annual output of the factory has increased from 14,000 lb. to more than 50,000 lb. of quinine, its extraction efficiency has been raised from not more than 75 per cent. to 95 per cent. of the possible, while the manufacturing cost of quinine has been reduced from Rs. 9 to a little more than Rs. 5 per lb. Moreover, the quinine reserve has risen from less than 3500 lb. to more than 163,000 lb. When it is remembered that cinchona takes ten years to arrive at maturity, this record of ten years' work must be regarded as a remarkable achievement. The work of reconstruction initiated by Sir David Prain has been most ably carried on by Major Gage, his successor in office, who records his indebtedness to Mr. Shaw, the Government quino-

logist, and to the managers of the two plantations, Mr. H. F. Green and Mr. P. T. Russell, through whose keen interest and cordial co-operation the success of the undertaking has been rendered possible.

It has long been suspected that the mutarotation phenomena observed in freshly-prepared solutions of many sugars might be due, not to a direct isomeric change, but to changes involving the formation of one or more intermediate products. Direct evidence in favour of this view is given in a paper by Prof. Irvine and Miss Steele on "The Mechanism of Mutarotation in Aqueous Solution," which appears in the August issue of the Chemical Society's Journal. The curves showing the changes of conductivity and of rotatory power in freshly-prepared aqueous solutions of tetramethylglucose are of the usual simple form; but when the sugar is dissolved in aqueous boric acid the conductivity passes through a maximum at the end of about two hours, whilst the rotatory power shows a well-marked arrest at about the same time. These observations indicate the formation of an intermediate product capable of combining with boric acid. The authors consider that this product is an oxonium hydrate. The conductivity curve gives some indication, however, that the limit of complexity has not yet been reached, and that there may be two intermediate products instead of only one.

Engineering for September 17 has a concluding article on worm-gear in which is contained the discussion on an important paper by Mr. F. W. Lanchester, reprinted in previous articles. The Lanchester worm is of the hollow type, and very careful tests reveal very high and consistent efficiencies. The preservation of the oil film between the surfaces in contact is all-important, and it is possible that the film can be kept better in place with a hollow worm than a parallel one. Mr. Lanchester says that for the purposes of discussion the surfaces in contact in his worm-gear may be represented by ellipses of elongated form. The motion is broadside, and the pressure is continually exerted on a region to which the oil had just previously been squeezed, so that the surface continually floated on an oil film instead of sinking through it. With light pressures this action is not important, but when the pressures exceeded half-ton to one ton per square inch the squeezer action became important. The gear was applied to the Lanchester car in 1897, and had been fitted to every Lanchester car since that date.

THE Manchester Literary and Philosophical Society has published a catalogue of the serial publications in its library. The catalogue has been compiled under the direction of the honorary librarian, Mr. C. L. Barnes, by the librarian, Mr. A. P. Hunt. The total number of current publications at present received by the society is 810; and these, together with a number of serials no longer in progress, have all been dealt with. To facilitate the finding of any individual work, a copious index has been added, in which each town, institution, and title of publication is mentioned separately.